

WHAT IS CLAIMED IS:

Sub
1. A transport element, comprising:
a port group comprising a plurality of
geographically distributed ports;
5 point-to-multipoint connectivity between the ports;
and
an identifier operable to represent the port group
as a single element to disparate elements.

10 2. The transport element of Claim 1, wherein the
transport element is defined in a transport network, the
identifier operable to represent the port group as a
single element to an external node outside the transport
network.

15 3. The transport element of Claim 2, wherein the
port group is operable to participate with the external
node in protocol exchanges.

20 4. The transport element of Claim 1, wherein the
transport element comprises a transport router
interconnecting a set of subtending Internet protocol
(IP) routers.

25 5. The transport element of Claim 1, wherein the
transport element comprises a transport Ethernet switch
interconnecting a set of subtending Ethernet switches.

30 6. The transport element of Claim 1, wherein the
transport element comprises a transport Frame Relay
switch interconnecting a set of subtending Frame Relay
switches.

7. The transport element of Claim 1, wherein the
port group is user protocol independent and transparently
interconnects a plurality of external ports of an
5 external network.

8. The transport element of Claim 1, wherein the
transport element is defined in a transport network
including a plurality of transport elements, further
10 comprising the transport element unaware of an internal
topology of the transport network outside of the
transport element.

9. The transport element of Claim 1, wherein the
15 transport element is defined in a transport network
including a plurality of transport elements, further
comprising the transport element unaware of topologies of
the other transport elements in the transport network.

20 10. The transport element of Claim 1, further
comprising a primary processor for the transport element,
the primary processor operable to generate routing
information for the transport element and to distribute
the routing information to the ports in the port group
25 for traffic processing.

11. The transport element of Claim 10, wherein the routing information comprises a routing information base (RIB), further comprising a secondary processor for each port in the port group, the secondary processor operable
5 to receive the RIB from the primary processor and to generate a forwarding information base (FIB) for the port based on the RIB.

12. The transport element of Claim 1, further
10 comprising a set of high-speed links directly connecting the ports of the port group.

13. The transport element of Claim 1, further
15 comprising multipoint-to-multipoint connectivity between the ports.

14. The transport element of Claim 1, further
comprising each port operable to receive Internet
protocol (IP) packets, to add an internal transport
20 overhead to the IP packet to generate an internal packet,
and to transmit the internal packet directly on an
optical link to an egress port in the port group.

15. The transport element of Claim 1, further
25 comprising the geographically distributed ports connected in a non-ring topology.

16. A transport network, comprising:
a plurality of geographically distributed nodes;
each node including a plurality of ports;
a transport element including a port group having a
5 plurality of ports from the geographically distributed
nodes; and
point-to-multipoint connectivity between the ports
of the port group.

10 17. The transport network of Claim 16, further
comprising an internal address space for the transport
network independent from an external network.

15 18. The transport network of Claim 16, further
comprising an identifier operable to represent the port
group as a single element within the transport network
and external to the transport network.

20 19. The transport network of Claim 16, further
comprising software stored on computer-readable media,
the software operable to selectively define the point-to-
multipoint connectivity between the ports of the port
group.

25 20. The transport network of Claim 16, further
comprising:
a plurality of transport elements each including a
port group having a plurality of ports from the
geographically distributed nodes; and
30 point-to-multipoint connectivity between the ports
of each port group.

21. The transport network of Claim 16, further comprising an identifier operable to represent the port group as a single element to an external node, the port group operable to use the identifier to participate with
5 the external node in protocol exchanges.

22. The transport network of Claim 16, further comprising the transport element unaware of an internal topology of the transport network outside of the
10 transport element.

23. The transport network of Claim 16, further comprising a plurality of transport elements, the transport element unaware of topologies of the other
15 transport elements in the transport network.

24. The transport network of Claim 16, further comprising:

each node including a plurality of processors
20 operable to operate the ports of the node; and
at least one processor selectively assignable to control the transport element.

25. The transport network of Claim 24, further comprising a processor of a node assigned to control the transport element, the processor operable to generate routing information for the transport element and to distribute the routing information to the ports in the port group for traffic processing.

30

26. The transport network of Claim 16, further comprising a set of high-speed links directly connecting the ports of the port group.

5 27. The transport network of Claim 16, further comprising multipoint-to-multipoint connectivity between the ports.

10 28. The transport network of Claim 16, further comprising each port of the port group operable to receive Internet protocol (IP) packets, to add an internal transport overhead to the IP packet to generate an internal packet and to transmit the internal packet directly on an optical link to an egress port in the port
15 group.

20 29. The transport network of Claim 16, further comprising the ports in the port group connected in a non-ring topology.

30. A node for a telecommunications network,
comprising:

Sub
A1
5 a first port and a second port each including a
receive-transmit pair (RTP), the RTP including a high-
speed demultiplexer operable to process ingress traffic,
a high-speed multiplexer operable to process egress
traffic, and an interface to an external network
connected to an internal network including the node;

10 a processing system operable to store a first
routing model for a first port group including the first
port and at least one geographically distributed port and
store a second routing model for a second port group
including the second port and at least one geographically
distributed port; and

15 the first port programmable to process traffic based
on the first routing model and the second port
programmable to process traffic based on the second
routing model.

20 31. The node of Claim 30, wherein the first routing
model comprises only the topology of the first port group
and the second routing model comprises only the topology
of the second port group.

25 32. The node of Claim 30, the processing system
further comprising a first central processing unit (CPU)
operable to operate the node and a second CPU operable to
be a primary CPU for the first port group, the primary
CPU operable to generate the routing model for the first
30 port group and to distribute the routing model to each of
the ports in the first port group.

5

Sub
A15
34. A method for provisioning a transport element
in a transport network, comprising:

defining at least one port group in the transport
network, the port group comprising a plurality of ports
from geographically distributed nodes of the transport
network;

defining point-to-multipoint connectivity between
the ports in the port group; and

representing the port group as a single entity to an
10 external network.

35. The method of Claim 34, further comprising:
discovering a topology of the port group; and
generating routing information based on the topology
15 of the port group to define the point-to-multipoint
connectivity between ports of the port group.

36. The method of Claim 35, further comprising:
generating the routing information at a centralized
20 location for the port group; and
distributing the routing information to each of the
ports in the port group.

37. The method of Claim 34, wherein the transport
25 element is a transport router and the identifier
comprises a router identifier.

38. The method of Claim 37, further comprising
peering the transport router with subtending routers.

group.

5

```
primary processor;
```

10 processor based on the topology of the port group; and

processors for each port.